



Mini-Circuits®

CERAMIC

Low Pass Filter

50Ω DC¹ to 490 MHz

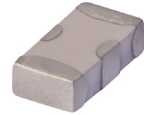
LFCN-490+

FEATURES

- Excellent power handling, 8.5 W
- Small size
- 7 sections
- Temperature stable
- LTCC construction
- Protected by U.S Patent 6,943,646

APPLICATIONS

- Harmonic rejection
- VHF/UHF transmitters/receivers



Generic photo used for illustration purposes only

CASE STYLE: FV1206

+RoHS Compliant

The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	DC-F1	DC-490	—	—	1.2	dB
	Freq. Cut-Off	F2	650	—	3.0	—	dB
	VSWR	DC-F1	DC-490	—	1.2	—	:1
Stopband	Rejection Loss	F3	800	20	—	—	dB
		F4-F5	880-2500	—	40	—	
	VSWR	F6	6000	—	20	—	:1
		F3-F6	800-6000	—	20	—	

1. In Applications where DC isolation to ground is required, coupling capacitors are recommended to avoid DC leakage. Alternatively, if DC pass IN-OUT is required, Mini-Circuits' "D" suffix version of this model will support DC IN-OUT, and provide >100 MOhm isolation to ground.

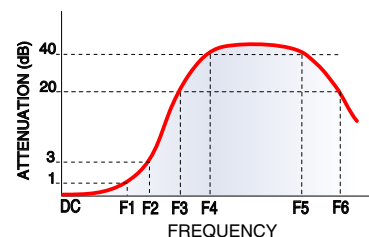
2. Measured on Mini-Circuits Characterization Test Board TB-LFCN-490+.

ABSOLUTE MAXIMUM RATINGS

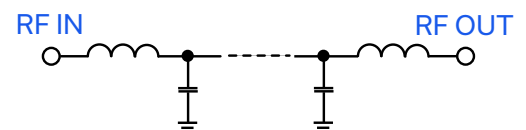
Parameter	Ratings
Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
RF Power Input ³	8.5 W max. at +25°C

3. Passband rating, derate linearly to 3.5 W at +100°C ambient.
Permanent damage may occur if any of these limits are exceeded.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC



REV. N
ECO-026186
LFCN-490+
MCL NY
250710





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Low Pass Filter

LFCN-490+

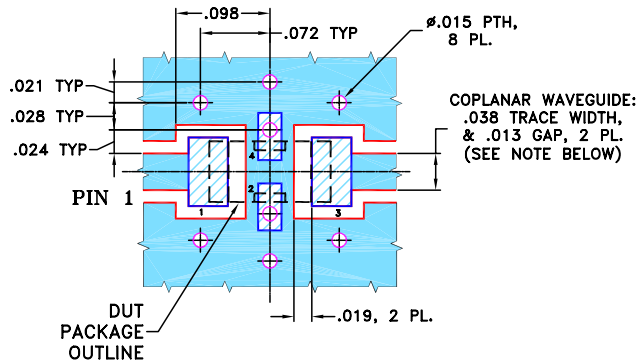
50Ω DC¹ to 490 MHz

PIN CONNECTIONS

RF IN	1
RF OUT	3
GROUND	2,4

PRODUCT MARKING: ZE

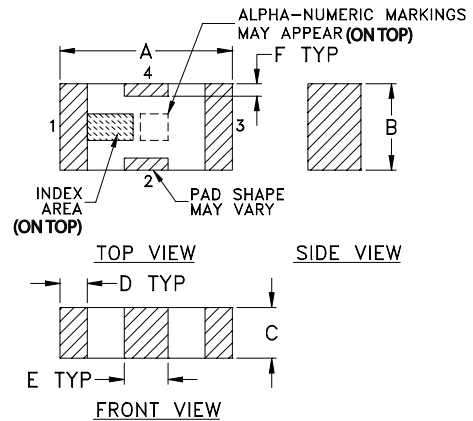
DEMO BOARD MCL P/N: TB-LFCN-490+
SUGGESTED PCB LAYOUT (PL-137)



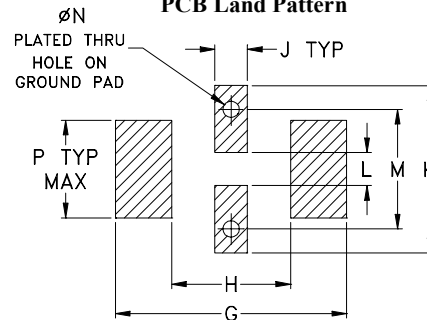
NOTES: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .020" ± .0015".
COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	
.126	.063	.037	.020	.032	.009	.169	
3.20	1.60	0.94	0.51	0.81	0.23	4.29	
H	J	K	L	M	N	P	wt
.087	.024	.122	.024	.087	.012	.071	grams
2.21	0.61	3.10	0.61	2.21	0.30	1.80	.020

TAPE & REEL INFORMATION: F71



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Low Pass Filter

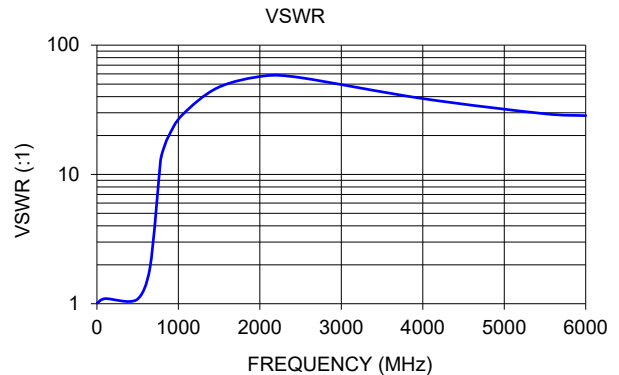
LFCN-490+

50Ω

DC¹ to 490 MHz

TYPICAL PERFORMANCE DATA AT +25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1	0.05	1.01
100	0.25	1.09
490	0.82	1.08
650	2.45	1.88
780	26.27	12.71
790	30.75	13.70
810	41.27	15.26
880	48.37	19.76
1050	39.38	28.96
1485	67.14	46.96
2065	66.75	57.91
2500	54.57	56.04
4000	36.98	38.61
5500	24.86	29.46
6000	24.74	28.49



NOTES

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



Ceramic Low Pass Filter

LFCN-490+

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURNLOSS (dB)		
	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C
1	0.02	0.05	0.08	47.08	46.06	45.07	47.08	46.06	46.01
50	0.15	0.18	0.21	30.19	29.03	28.44	29.98	28.79	28.26
100	0.20	0.25	0.29	27.56	26.92	26.68	27.09	26.38	26.03
490	0.66	0.82	0.96	28.82	28.80	28.43	27.90	27.66	27.14
545	0.84	1.04	1.23	23.04	22.47	21.75	23.36	22.86	22.18
650	1.98	2.45	2.91	10.80	10.30	9.80	13.06	13.17	13.28
670	2.57	3.19	3.81	8.78	8.31	7.85	11.63	11.97	12.33
700	4.29	5.34	6.43	5.70	5.29	4.91	9.34	9.73	9.97
730	8.44	10.24	12.07	2.95	2.82	2.71	6.04	6.22	6.22
750	13.26	15.54	17.78	1.87	1.93	1.97	4.21	4.44	4.52
765	17.90	20.47	23.00	1.44	1.57	1.67	3.32	3.59	3.72
780	23.37	26.27	29.11	1.21	1.37	1.48	2.73	3.01	3.17
790	27.57	30.75	33.83	1.10	1.27	1.39	2.45	2.73	2.90
800	32.42	35.89	38.94	1.03	1.20	1.33	2.23	2.51	2.68
810	38.09	41.27	42.83	0.97	1.14	1.27	2.05	2.32	2.50
880	46.81	48.37	49.73	0.72	0.88	1.00	1.36	1.60	1.77
895	51.09	51.96	51.46	0.69	0.84	0.96	1.27	1.50	1.67
1050	39.27	39.38	39.49	0.47	0.60	0.71	0.77	0.95	1.09
1345	51.34	52.31	53.37	0.28	0.41	0.51	0.43	0.55	0.65
1485	68.77	67.14	65.29	0.24	0.37	0.47	0.34	0.46	0.55
1720	57.55	57.46	57.39	0.21	0.33	0.43	0.27	0.38	0.45
2065	67.96	66.75	65.92	0.18	0.30	0.39	0.22	0.32	0.37
2500	52.78	54.57	54.19	0.19	0.31	0.40	0.17	0.27	0.31
3000	48.24	47.60	45.88	0.22	0.33	0.43	0.18	0.28	0.35
3500	44.71	43.44	41.60	0.20	0.34	0.44	0.13	0.26	0.36
4000	37.19	36.98	36.50	0.28	0.45	0.56	0.18	0.33	0.44
4690	19.10	18.00	19.76	1.21	1.47	1.18	1.05	1.29	1.04
5000	24.39	24.39	24.91	0.47	0.62	0.72	0.34	0.52	0.64
5500	25.03	24.86	25.01	0.40	0.59	0.82	0.33	0.57	0.86
6000	24.65	24.74	25.16	0.41	0.61	0.84	0.29	0.51	0.72
6500	22.75	23.13	23.54	0.45	0.64	0.89	0.28	0.49	0.70
7000	23.18	23.00	23.10	0.49	0.73	0.92	0.28	0.49	0.67
7500	21.23	20.98	21.21	0.71	0.96	1.16	0.31	0.50	0.67
8000	20.61	20.76	20.93	1.07	1.09	1.21	0.31	0.49	0.64
8500	19.56	19.65	19.27	0.79	1.01	1.20	0.32	0.53	0.66
9000	18.75	18.61	18.58	0.89	1.14	1.23	0.35	0.58	0.69
9500	17.45	17.56	17.51	0.91	1.20	1.39	0.36	0.64	0.84
10000	16.76	16.84	16.98	0.77	1.10	1.40	0.49	0.87	1.20
12000	26.65	26.21	26.42	3.87	4.98	5.67	5.11	5.51	5.68
14000	22.70	21.05	19.95	2.19	3.13	3.96	1.39	1.83	2.23
16000	10.35	10.17	10.42	4.24	5.21	6.53	4.44	4.81	5.32
18000	12.76	13.67	15.83	6.18	6.17	6.37	14.90	10.75	10.01

REV. X1
LFCN-490+
080722
Page 1 of 1



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

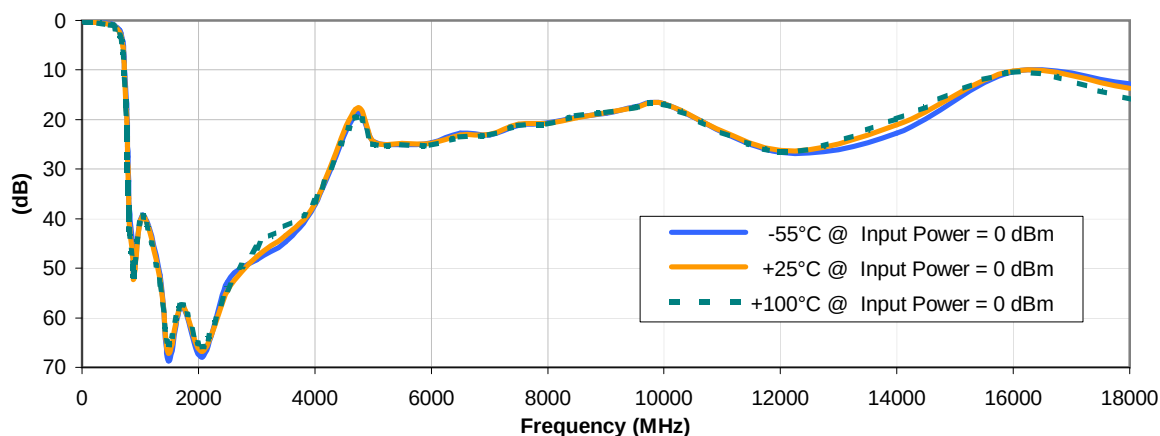


Ceramic Low Pass Filter

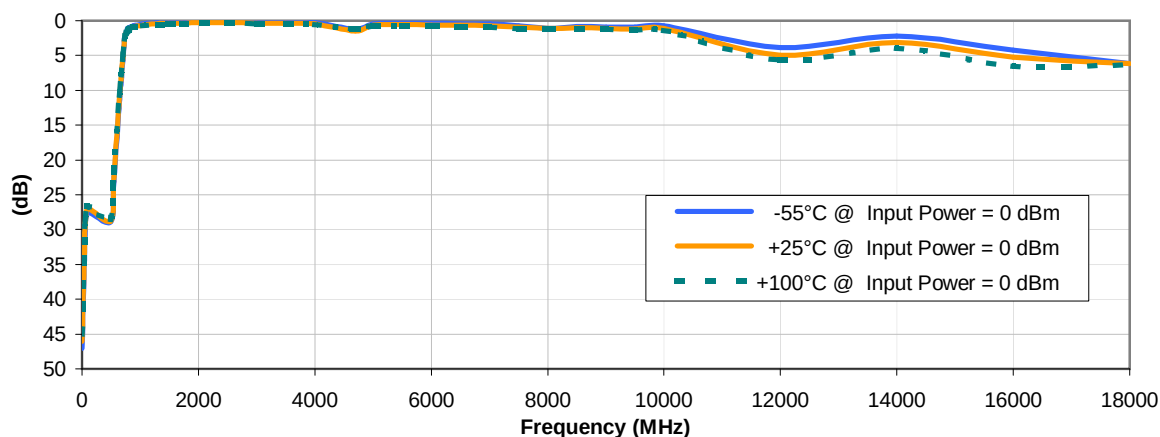
Typical Performance Curves

LFCN-490+

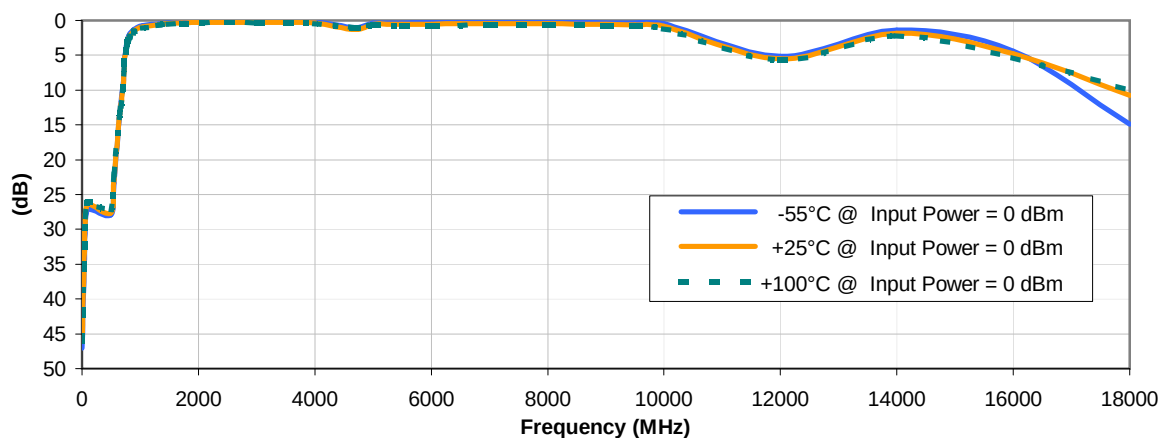
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



REV. X1
LFCN-490+
080722
Page 1 of 1



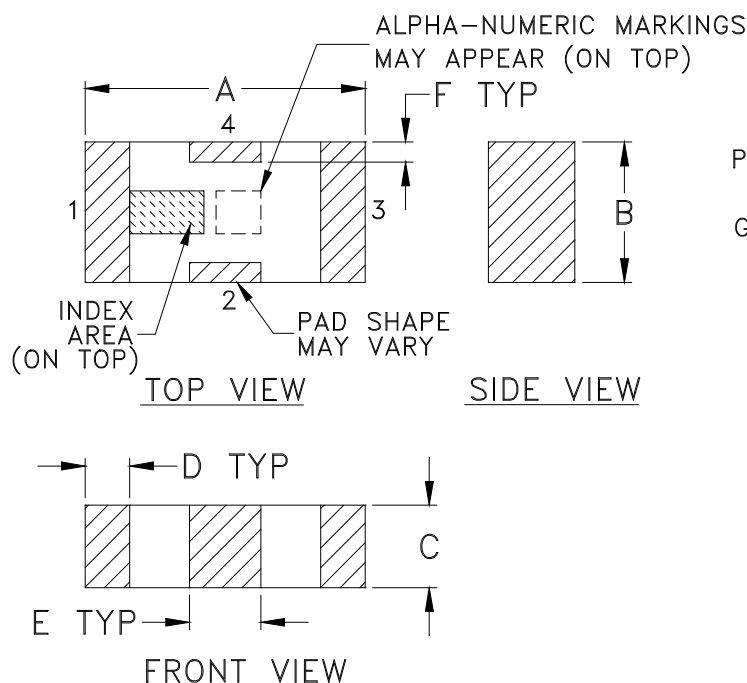
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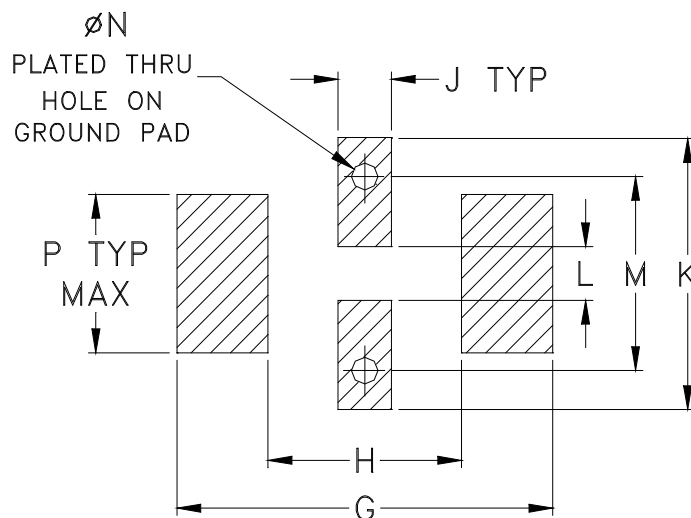
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Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAM
FV1206	.126 (3.20)	.063 (1.60)	.037 (0.94)	.020 (0.51)	.032 (0.81)	.009 (0.23)	.169 (4.29)	.087 (2.21)	.024 (0.61)	.122 (3.10)	.024 (0.61)	.087 (2.21)	.012 (0.30)	.071 (1.80)	.020

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F71

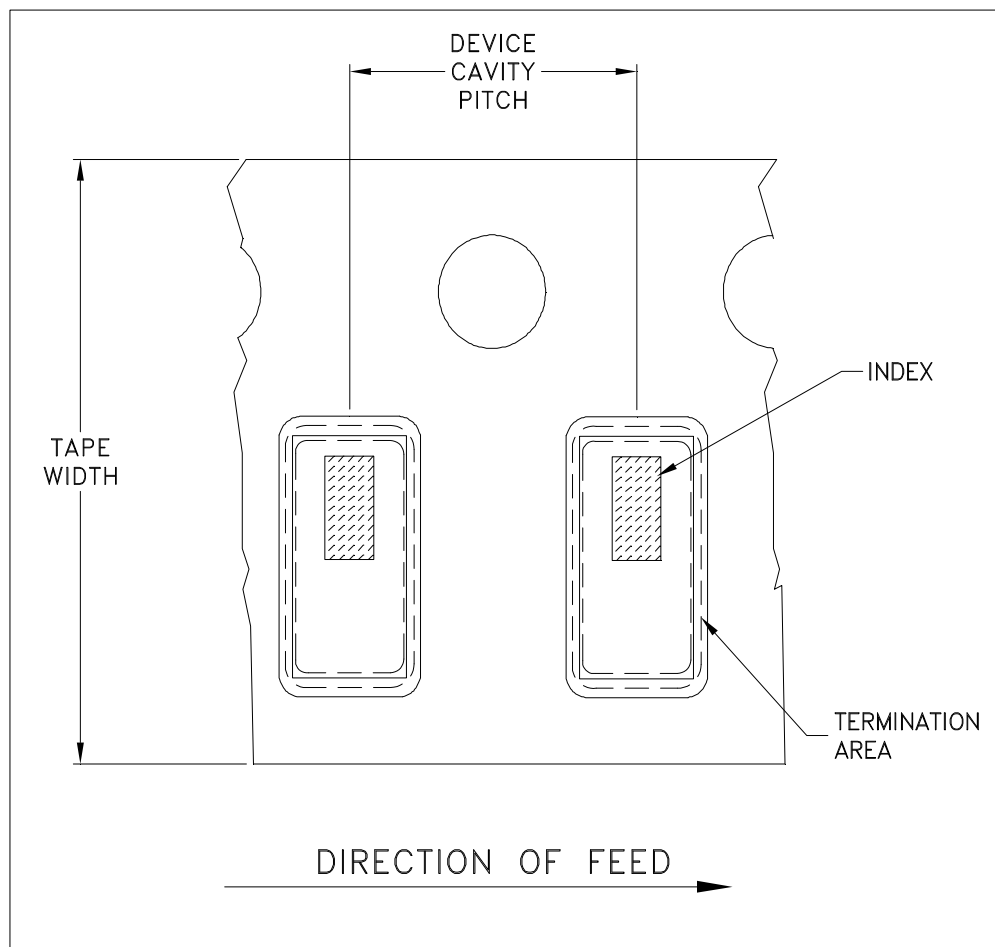


ILLUSTRATION 1

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	3000

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



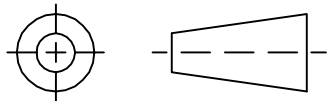
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RF/IF MICROWAVE COMPONENTS

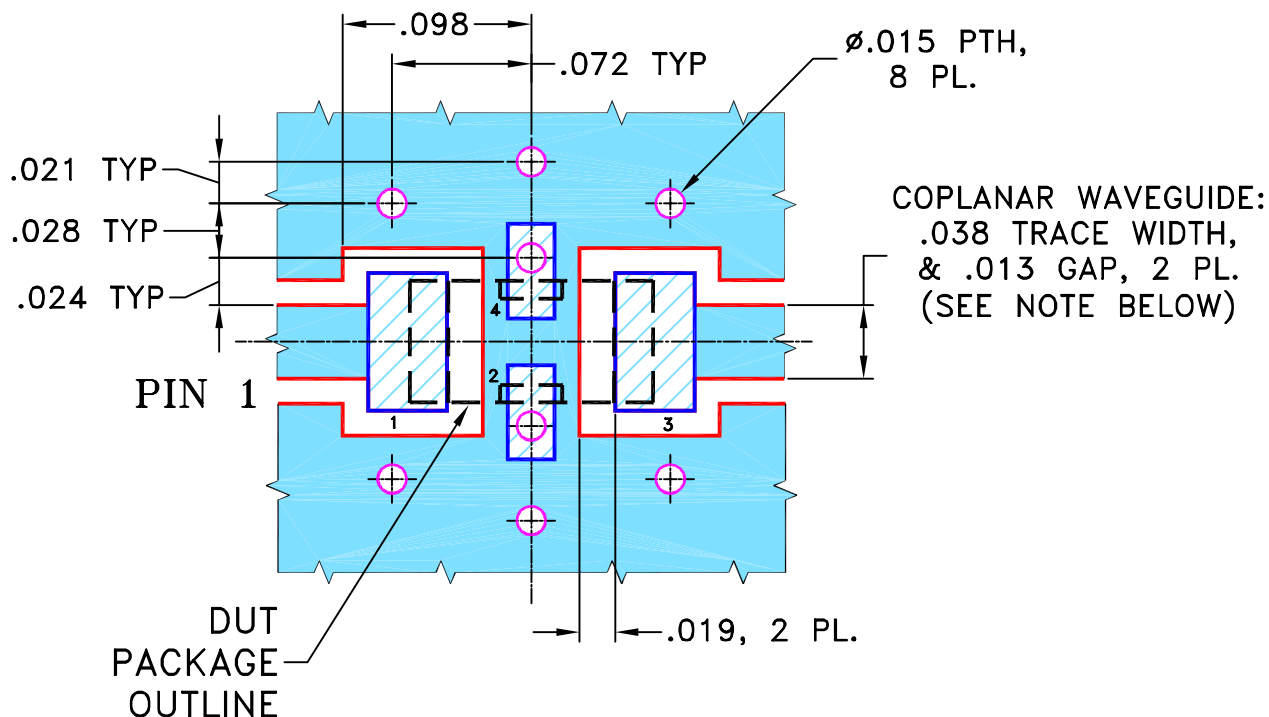
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88634	NEW RELEASE	08/28/03	GF	ABD
A	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206 CASE STYLE, "nx" PIN CONNECTION

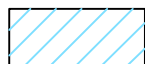


NOTES: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020" $\pm$.0015".
 COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC
 (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$

3 PL DECIMALS $\pm$.005

ANGLES $\pm$

FRACTIONS $\pm$

DRAWN

GF

08/27/03

CHECKED

AV

08/28/03

APPROVED

ABD

08/28/03

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ASHEETA1.DWG REV:A DATE:01/12/95



Mini-Circuits®

13 Neptune Avenue
 Brooklyn NY 11235

PL, nx, FV1206, LFCN/HFCN, TB-270

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-137

REV:

A

FILE: 98PL137

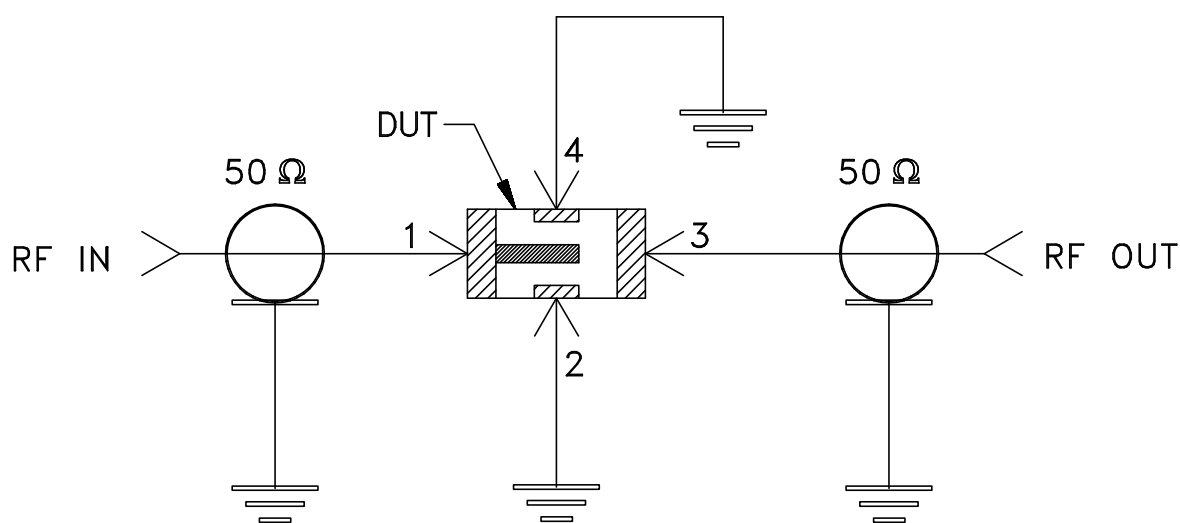
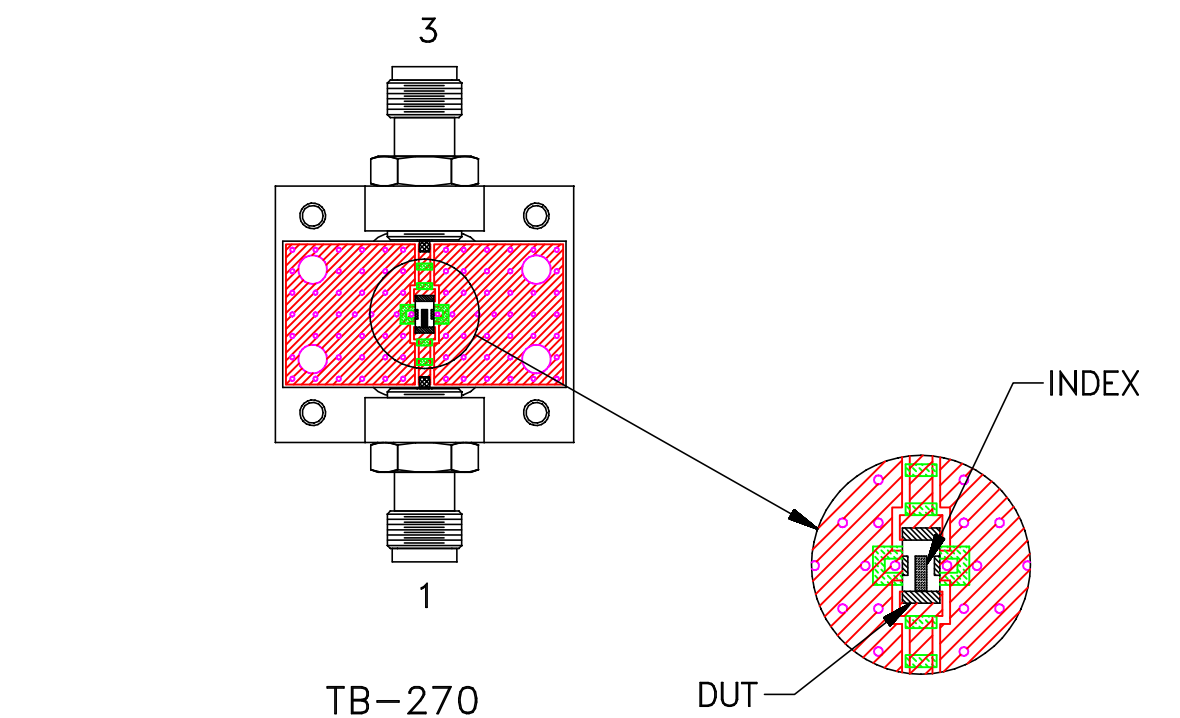
SCALE:

10:1

SHEET:

1 OF 1

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: ROGERS RO4350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A